Reading Horizons: A Journal of Literacy and Language Arts

Volume 19
Issue 1 *October 1978*

Article 9

10-1-1978

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DRILL VERSUS DISCOVERY: THE EFFECTS ON STUDENT ATTITUDES

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Much emotional heat has been generated during the past three decades over the consequences of "direct," "authoritarian," "didactic," "rigid," and "repetitive drill" instruction. These terms and other synonyms have assumed in some quarters the emotive equivalent of the terms "traitor," "incompetent," and "sadist." Recent leaders in education have generated numerous alternatives to the traditional teaching patterns suggested by the supposedly odious terms. These alternatives have included: inquiry, discovery, interest centers, trade-book reading programs, and such organizational arrangements as open-concept rooms and so-called "free" schools. Work by Jerome S. Bruner (1966) for instance, has caused us to shift our concern from the memorization of facts to the discovery of principles. This emerging approach to education has had its inevitable effects upon the teaching of reading.

From as early as the work of Edmund Burke Huey in 1908, there has been movement in the reading field in the direction of emphasizing acquisition of ideas and concepts, perhaps at the expense of accuracy in decoding. Recent texts in methodology continue to belabor the question of direct teaching vs nondirective teaching. Silvaroli and Wheelock (1975) develop the terms "pre-structured" and "emerging" classrooms to dichotomize the concepts discussed herein, with a bias toward the latter organization. A sub-heading appearing in a recent text on phonics instruction, interestingly entitled "The Answer to the Entire Phonics Problem," repeatedly stresses "discovery and creativity" as opposed to "formal" teaching.

Some of the results of the recent pressures toward informality and discovery have been, either intentionally or accidentally, to avoid the teaching of rules, to neglect the direct teaching of many sight words, and to teach comprehension skills either offhandedly or incidentally. Paradoxically, there has been a parallel growth in highly structured, drill oriented programs, such as Distar, Sullivan Programmed Readers, and the Ethna Reid Program. The resultant conflict may result in the sabotage of structured programs by teachers who were trained to value teacher creativity and student participation in the selection of learning tasks. (Hill, 1971)

Extant research, however, has not clearly supported many of the inferences and suppositions concerning the outcomes of differing teaching styles. The teaching of categorizing concepts to Black kindergarten children by means of direct teaching and incidental opportunity and exposure was investigated by Puryear (1970). He found that direct teaching was

significantly superior in producing cognitive outcomes, regardless of age, sex, and I.Q. Similar results were obtained by Kersh and Wittrock (1962) who used both discovery methods and direct rote memory teaching to teach literature concepts to sixth graders. These investigators found direct rote memory drill to produce significantly superior short term memory and application. There were no significant differences in long term memory and transfer.

Two additional studies are of particular import to the present investigation. When comparing the critical reading outcomes of authoritarian (i.e., directive) teachers and nonauthoritarian teachers, Mueller found no significant difference in the measured outcomes. Whenever the prospect of rigid, drill-oriented programs emerges, one of the objections is usually concerned with the affective outcomes. It is assumed in many quarters that children have negative reactions to rigid drill-oriented teaching. Bennett (1973) found, however, that there were no significant differences in the affective outcomes when sixth graders were taught by inquiry methods and direct authoritarian teaching. A relative paucity of hard research in this area would indicate that the heat generated by this topic exceeds the light of research.

The purpose of the present study was to investigate the effects of imposing a highly structured, repetitive, teacher-oriented routine for teaching decoding and comprehension upon a traditional teacher's guide oriented basal reading program. The Ethna Reid Reading program was used. This study is not regarded as an evaluation of that specific program per se because of methodological omissions which are vital to the Ethna Reid program. Both cognitive and affective outcomes were measured.

METHOD

Subjects: Teachers in three classrooms were selected to participate as a partial requirement for an advanced reading course. Students who attended these teacher's classes included a rural, white, predominantly lower-middle class sixth grade (N = 50) an urban, white, generally middle class sixth grade (N = 34) and first grade (N = 28) and an urban first grade composed predominantly of lower socio-economic status black children (N = 26). Total N = 138.

Materials: All classrooms involved used the Houghton-Mifflin Basal Reading Series, a program which had been used in these rooms for a number of years. The teacher's guide was followed rigorously by both experimental and control groups. Rooms in all schools and levels were departmentalized, with reading classes being divided into three groups.

Experimental Procedure: S's were randomly divided into control and experimental groups. During approximately 60 hours of instruction, both groups received basal reading instruction. The experimental groups received drill in word identification and comprehension, using the format suggested by the Ethna Reid Reading Program. A rigidly followed set of Directives was provided for teaching sight words, teaching context, teaching phonics, and teaching word analysis (affixes). Figure one includes

the directives for teaching sight words. With each word to be presented, the teacher made the decision concerning which of the four methods would be followed. This instruction was supplemental to the routines and worksheets provided by the basal program. Figure two illustrates the Mastery Test each experimental S took following instruction. The directive routine was redone if a word was missed. Figure three illustrates a portion of the directives for teaching "Judging the Accuracy of Information." The basic difference between the experimental and control groups was the rigid, repetitive drill provided by the Ethna Reid format.

Prior to commencing the experimental procedures, the three teachers involved, the experimenter, and two graduate aids were given 18 hours of instruction in the Ethna Reid program. Instruction was given by a graduate of the Ethna Reid Training Program who is certified to train other personnel. During the course of the experimental treatment, teachers were observed by the researchers. An observation record, recording whether or not the directives were being accurately followed, other diagnostic and recording procedures were being followed. These independent observations were quantified, submitted to a Kendall Test for Independence. The null-hypothesis that the observation data were not identical was rejected at $v > 0 = .06$.

EVALUATION

Experimental subjects were administered the Woodcock Reading Mastery Tests, Form A for pretest, Form B for posttest. The Word Attack SUBTEST (Measure 1), Passage Comprehension subtest (Measure 2), and Total Reading score (Measure 3) were used for statistical analysis. Scores were reported as Grade Equivalents. Using a Multiple Regression Analysis of Variance, six variables (control, experimental, 1st grade, 5th and 6th grade, high achievement, low achievement) were tested for possible interaction. Achievement grouping was achieved by dividing each grade level tested at the mean.

Table one displays the program for evaluation of the test data. Table two, which reports the results of the Multiple Regression Analysis of Variance indicates that none of the Beta's differ from zero significance. Variation due to any of the six variables is not statistically different.

In addition to the above data, each child was given as a pre- and post-test a semantic differential assessment which was read to each child. The test contained twenty attitude toward reading (i.e., My reading book is . . . .) questions and twenty attitude toward common non-reading activities (i.e. Watching television is . . . .) questions. Children were given three appropriate choices, such as; enjoyable, alright, terrible. One-tailed t-tests indicated no significant difference between experimental and control groups on either reading or non-reading questions.

Following the experimental procedure, the following change of attitude comparisons were made with the t-tests: experimental vs control on reading questions, experimental vs control on non-reading questions, experimental vs control for first grade on reading questions, experimental vs control for

FIGURE ONE

Sight

1	2	3

1. YOU WILL LEARN TO READ A NEW WORD BY SIGHT.
2. THIS WORD IS _____. (Teacher states.)
3. READ.
4. Teacher uses word in oral sentences.
5. READ.
6. SPELL AND READ.
7. Use in Word Formation exercise. (See attached page.)
8. (Remove model.) WRITE, SPELL AND READ.
9. (Show model.) PROOF AND CORRECT.
10. (Remove model.) SPELL AND SAY. LOOK AT ME.
11. THIS WORD IS _____. READ.
12. THINK OF A SENTENCE USING THE WORD _____.
13. TELL (ME/PARTNER) YOUR SENTENCE.
14. Pupils read the new word in sentence(s).
15. Use in Word Discrimination exercise. (See attached page.)
16. Multiple untimed practices.
17. Single and multiple timed practices. (Some directives will be repeated for multiple practices.)

Words Taught

1. _____
2. _____
3. _____

5th and 6th grade on reading questions, reading vs non-reading for first grade, reading vs non-reading for 5th and 6th grade. Only the test of change in attitude toward reading vs non-reading questions of first grade was significant, as indicated in Table 3. In this instance, while the children displayed an increased positive attitude toward non-reading items, their attitude toward reading moved toward a more negative attitude.

IMPLICATIONS AND CONCLUSIONS

The Ability to make strong inferences from this study may be limited by

FIGURE TWO

SERIES: The Kaleidoscope Readers — Roosevelt High School Title 1
BOOK: *Two Blades of Grass* — Project for Reading Development
CHAPTER: 3 "Tough Kid"
STORY: *To Be A Man* (Check In) And *The Frost*
PAGES: 36-38

Name_____ Date_____ Completed_____

Teacher_____ Period_____ Yr. in School_____

MASTERY TEST NO. 3-4 A

"CHECK IN"

Fever	Beneath	Destroy	Velvet
Pretend	Shelter	Member	Reward
Kettle	Prepare	Rescue	Gone
Tremble	Crawl	Fix	Some
Minutes	Five	Is	Itself
Red	Shelter	Went	Driver
Candy	Himself	Sinking	Frightened
Score	Here		

Mastery: Spelling____ Reading____ Writing____ Vocab____ COMP____

CRITERIA FOR PASSING WORD LIST: (30 WORDS)

	DATE	TIME
READ: 100% IN 30 SECONDS		
SPELL: 100%		

MASTERY TEST NO. 3-4 B

"THE FROST"

Young	Seize	Every	Your
Fly	Ere	Courtyard	Glitters
White	Cruel	Grass	Once
That			

Mastery: Spelling____ Reading____ Writing____ Vocab____ Comp____

CRITERIA FOR PASSING WORD LIST: (13 WORDS)

	DATE	TIME
READ: 100% IN 13 SECONDS		
SPELL: 100%		

– DELETE FROM SPELLING LIST

FIGURE THREE

Part I – Judging the Accuracy of Information

A. Judging the Accuracy of Information Through Personal Experience (When teaching listening comprehension, substitute LISTEN or HEAR for READ when appropriate.)

TEACHER DIRECTIVES (CAPS) and Procedures (lower case).	Pupil Responses to be Elicited and Praised.
1. YOU WILL JUDGE/DECIDE IF THE INFORMATION YOU READ COULD BE FACT.	1. Looks at teacher.
2. FACT IS INFORMATION THAT IS TRUE. IT IS ACCURATE OR CORRECT. IT IS INFORMATION THAT USUALLY CAN BE PROVED TO BE TRUE.	2. Looks at teacher.
3. WHAT IS FACT? Follow-up Procedures: INFORMATION TELLS SOMETHING. FOR EXAMPLE: TODAY IS *SEPTEMBER 24*. THIS INFORMATION TELLS TODAY'S DATE. SCHOOL BEGINS AT *8:30* IN THE MORNING. THIS INFORMATION TELLS WHEN SCHOOL BEGINS. Repeat #2 and reiterate, FACT IS INFORMATION THAT IS TRUE. Repeat #3	3. "Fact is information that is true." Any statement which supports this concept. + Remember to give praise! Examples: "Fine." "Right." "Good listening and remembering."
4. a. TO HELP YOU JUDGE WHETHER OR NOT THE INFORMATION YOU READ COULD BE FACT, YOU CAN USE YOUR OWN EXPERIENCE. YOU MAY HAVE SEEN IT OR DONE IT.	4. a. Looks at teacher.

b. Modeling directives. (1) I WILL READ THIS INFORMATION AND I WILL JUDGE/DECIDE IF IT COULD BE FACT BY USING MY OWN EXPERIENCE. WHAT I HAVE SEEN OR DONE.	(1) Looks at teacher.
(2) Read aloud from chart. TADPOLES CHANGE INTO FROGS.	(2) Looks at teacher or chart.
(3) I KNOW THIS INFORMATION IS ACCURATE. I HAVE *WATCHED TADPOLES GROW LEGS AND THEIR TAILS BECOME SMALLER UNTIL FINALLY THEY ARE FROGS*. I USED MY OWN EXPERIENCE. THIS INFORMATION IS FACT. IT IS TRUE.	(3) Looks at teacher. +

Examples: "I like to see your eyes. You must be good listeners. Thank you."

at least two factors. There was some uncontrolled variance in the basal teaching technique of the teachers involved. More importantly, only about 20 percent of the Ethna Reid program was implemented.

It may be concluded that the addition of the repetitive and structured drill neither helped nor hindered the reading achievement which was measured. While the drill may not be worth the time and effort, neither will it inhibit learning, even though less material may be covered. In the case of the present research, about 15 percent less material was covered by the experimental group. This was attributed to the extra time consumed by drill and evaluation.

Of equal interest is the observation that the presence or absence of structure and drill did not seem to affect the children's attitudes toward reading. Reading teachers and others may be concerned over the finding that first graders' attitudes toward reading became more negative as the year progressed.

The present research should contribute a note of caution to much of the "common sense" folk-wisdom concerning the effects of drill. Additional research is needed in these areas, particularly in the area of the development of attitudes toward reading. Such questions as, "What are the affective effects of early childhood and primary education?" and "What are the causative factors in the attitude changes?" should have a high research

TABLE 1

MULTIPLE REGRESSION ANALYSIS OF SIX VARIABLES FOR THREE MEASURES OF READING ACHIEVEMENT

$$Y = \alpha + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + B_5X_5 + B_6X_6$$

X_1 + 0	control
+ 1	exp
X_2 + 0	first grade
+ 1	5th & 6th
X_3 + 0	Low
+ 1	High
X_4 + 0	control & 1st grade
+ 1	control & 5th or 6th
+ 2	exp & 1st grade
+ 3	exp & 5th or 6th
X_5 + 0	control & L
+ 1	control & H
+ 2	exp & L
+ 3	exp & H
X_6 + 0	1st grade & L
+ 1	5th or 6th & L
+ 2	1st grade & H
+ 3	5th or 6th & H

priority. Implementation of new or supplementary reading programs may not be as important as the classroom atmosphere or interaction which determines the child's desire to read.

TABLE 2

RESULTS OF MULTIPLE REGRESSION ANALYSIS OF VARIANCE FOR THREE MEASURES OF READING ACHIEVEMENT

Analysis of Variance for the Regression for Measure 1

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Squares	F Value
Attributable to Regression	6	28.11766	4.68627	0.63444
Deviation from Regression	125	923.29516	7.38636	
Total	131	951.41272		

Analysis of Variance for the Regression for Measure 2

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Squares	F Value
Attributable to Regression	6	20.41181	3.40196	1.86086
Deviation from Regression	125	228.52026	1.82816	
Total	131	248.93206		

Analysis of Variance for the Regression for Measure 3

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Squares	F Value
Attributable to Regression	6	10.90025	1.81670	0.96921
Deviation from Regression	125	234.30172	1.87441	
Total	131	245.20196		

TABLE 3

CHANGE IN ATTITUDE TOWARD READING VS. NON-READING QUESTION IN FIRST GRADE READERS ON ONE-TAILED "t" TEST

	$\overline{X}$			
Reading Q	−.032			
		df = 54	t = 2.39	$p < .01$
Non-reading Q	+ .071			

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